

PATENT COOPERATION TREATY

PCT

**NOTIFICATION CONCERNING
THE FILING OF AMENDMENTS OF THE CLAIMS**
(PCT Administrative Instructions, Section 417)

From the INTERNATIONAL BUREAU

To:

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Applicant	DAIMLERCHRYSLER AG et al

1. The applicant is hereby notified that amendments to the claims under Article 19 were received by the International Bureau on:

06 December 2004 (06.12.2004)

2. This date is within the time limit under Rule 46.1.

Consequently, the international publication of the international application will contain the amended claims according to Rule 48.2(f), (h) and (i).

3. The applicant is reminded that the international application (description, claims and drawings) may be amended during the international preliminary examination under Chapter II, according to Article 34, and in any case, before each of the designated Offices, according to Article 28 and Rule 52, or before each of the elected Offices, according to Article 41 and Rule 78.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. (41-22) 338.89.70	Authorised officer Thomas ROCHAIX (Fax 338 8970) Telephone No. (41-22) 338 8897
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New Patent Claims

1. A multi-cylinder internal combustion engine for a motor vehicle, having an exhaust line which is assigned to the cylinders (1 - 6) of the internal combustion engine (B) and in which an exhaust gas cleaning unit is arranged,
 - the cylinders (1 - 6) each being assigned a gas inlet valve (E) which is used for the charge cycle and has the purpose of letting combustion air into the combustion chamber of the cylinder and a gas outlet valve (A) which is used for the charge cycle and has the purpose of letting exhaust gases out of the combustion chamber and into the exhaust line,
 - at least one of the cylinders (1 - 6) of the internal combustion engine (B) having an additional outlet valve (Z) through which, in the opened state, a flow connection is established between the combustion chamber and the exhaust line, and
 - it being possible to activate the additional outlet valve (Z) of at least one cylinder (1) in conjunction with a regeneration operating mode for regenerating the exhaust gas cleaning unit, characterized
- 25 in that when the additional outlet valve (Z) is activated via the connection which is opened by the additional outlet valve (Z), gas passes out of the combustion chamber of the at least one cylinder (1) and into the exhaust line and as a result an exhaust gas composition and/or exhaust gas temperature which are changed compared to the normal operating mode and promote the regeneration of the exhaust gas cleaning unit can be set.

2. The internal combustion engine as claimed in claim 1, characterized in that when the additional outlet valve (Z) is activated at least one cylinder can be operated with a fuel supply which is reduced
5 compared to the operating mode without activation of the additional outlet valve (Z).

3. The internal combustion engine as claimed in claim 1 or 2, characterized in that when there is at
10 least one cylinder with an additional outlet valve (Z) the additional outlet valve (Z) can be activated in a clocked fashion such that when there are a multiplicity of working cycles the additional outlet valve (Z) is opened in each case in the region of the top dead
15 center in the compression cycle and is otherwise closed.

4. The internal combustion engine as claimed in one of claims 1 to 3, characterized in that a cylinder
20 group (11) which is formed from at least two preferably adjacent cylinders with an additional outlet valve is provided.

5. The internal combustion engine as claimed in one of claims 1 to 4, characterized in that when there are at least two preferably adjacent cylinders with an additional outlet valve (Z) there is provision for the additional outlet valve (Z) to be activated.
25

30 6. The internal combustion engine as claimed in one of claims 1 to 5, characterized in that at least two cylinders are provided with an additional outlet valve, and the number of cylinders at which the additional outlet valve (Z) is activated can be set in a variable
35 fashion, in particular as a function of the exhaust gas temperature.

7. The internal combustion engine as claimed in one of claims 1 to 6, characterized in that when there is at least one cylinder with an additional outlet valve (Z), operation with a closed additional outlet valve 5 (Z) and with a fuel supply which is reduced compared to the normal operating mode becomes possible.

8. The internal combustion engine as claimed in one of claims 1 to 7, characterized in that the regeneration operating mode can be set when the additional outlet valve (Z) of at least one cylinder 10 (1) is activated in an operating range with reduced power output by the internal combustion engine (B).

15 9. The internal combustion engine having an exhaust gas turbocharger as claimed in one of claims 1 to 8, characterized in that it becomes possible for the charge pressure to be influenced in conjunction with a regeneration operating mode.

20 10. The internal combustion engine having an adjustable exhaust gas recirculation device as claimed in one of claims 1 to 9, characterized in that it becomes possible for the quantity of recirculated 25 exhaust gas to be influenced in conjunction with a regeneration operating mode.

11. The internal combustion engine as claimed in one of claims 1 to 10, characterized in that the regeneration operating mode is provided when the vehicle is stationary.

30 12. A method for operating a multi-cylinder internal combustion engine for a motor vehicle, having an exhaust line which is assigned to the cylinders (1 - 6) of the internal combustion engine (B) and in which an exhaust gas cleaning unit is arranged,

- the cylinders (1 - 6) each being assigned a gas inlet valve (E) which is used for the charge cycle and has the purpose of letting combustion air into the combustion chamber of the cylinder and a gas outlet valve (A) which is used for the charge cycle and has the purpose of letting exhaust gases out of the combustion chamber and into the exhaust line,

5 - at least one of the cylinders (1 - 6) of the internal combustion engine (B) having an additional outlet valve (Z) through which, in the opened state, a flow connection is established between the combustion chamber and the exhaust line, and

10 - the additional additional outlet valve (Z) of at least one cylinder (1) is opened at least temporarily in conjunction with a regeneration operating mode for regenerating the exhaust gas cleaning unit,

15 characterized
in that, via the connection which is opened by the additional outlet valve (Z), gas passes out of the combustion chamber of the at least one cylinder (1) and into the exhaust line and as a result an exhaust gas composition and/or exhaust gas temperature which are changed compared to the normal operating mode and promote the regeneration of the exhaust gas cleaning unit are set.

20 13. The method as claimed in claim 12, characterized in that at least one cylinder is operated with an at least temporarily opened additional outlet valve (Z) and with a fuel supply which is reduced compared to the normal operating mode.

25 14. The method as claimed in claim 12 or 13, characterized in that the additional outlet valve (Z) of at least one cylinder is kept open in the region of the top dead center in the compression stroke, and

otherwise kept closed, during a multiplicity of working cycles.

15. The method as claimed in one of claims 12 to 14,
5 characterized in that the additional outlet valve (Z)
of at least one cylinder is kept continuously open
during a multiplicity of working cycles of the
cylinder.

10 16. The method as claimed in one of claims 12 to 15,
characterized in that at least one cylinder of the
internal combustion engine (B) is operated with a fuel
supply which is reduced compared to the normal
operating mode.

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17. The method as claimed in one of claims 12 to 16,
characterized in that at least two preferably adjacent
cylinders are provided with an additional outlet valve
(Z) and their additional outlet valves (Z) are
20 activated synchronously.

18. The method as claimed in one of claims 12 to 17,
characterized in that at least two cylinders are
provided with an additional outlet valve (Z), and the
25 number of cylinders with an at least temporarily opened
additional outlet valve (Z) is set as a function of the
load of the internal combustion engine.

19. The method for operating an internal combustion
30 engine having an exhaust gas turbocharger as claimed in
one of claims 12 to 18, characterized in that a reduced
charge pressure is set in conjunction with the
regeneration operating mode.

35 20. The method for operating an internal combustion
engine having an adjustable exhaust gas recirculation
device as claimed in one of claims 12 to 19,

characterized in that an increased quantity of recirculated exhaust gas is set in conjunction with the regeneration operating mode.

5 21. The method as claimed in one of claims 12 to 20, characterized in that the regeneration operating mode is carried out when the vehicle is stationary.